

1. A data storage cartridge of generally an exterior dimensional form factor of a tape cartridge having a leader block, said leader block comprising a hole therethrough for engagement by a threading pin, said data storage cartridge
5 comprising:
- a data storage device; and
- a cartridge shell comprising a substantially identical exterior dimensional form factor as said tape cartridge with said leader block, and comprising a blocking portion on at least one
10 side of said location of said leader block hole, to differentiate identification of said data storage cartridge from said tape cartridge, said cartridge shell mounting said data storage device therein.
2. The data storage cartridge of Claim 1, for use with a
15 transfer station, said transfer station having an optical source and sensor for sensing at the location of said leader block hole when a cartridge is at the end of travel in a receiver of said transfer station, wherein said cartridge shell blocking portion is arranged to block said optical source from said sensor when
20 said data storage cartridge is at the end of travel in said receiver, thereby indicating the presence of said data storage cartridge at said end of travel in said receiver, and providing

said differentiated identification of said data storage cartridge.

3. The data storage cartridge of Claim **1**, wherein said blocking portion is additionally located at a side of said location of
5 said leader block hole at which said threading pin begins engagement of said tape cartridges, thereby preventing said engagement of said data storage cartridge and providing said differentiated identification of said data storage cartridge.

4. The data storage cartridge of Claim **1**, additionally
10 comprising an external data transfer interface coupled to said data storage device for providing data transfer with respect to said transfer station.

5. The data storage cartridge of Claim **4**, additionally comprising:

15 a shock mount supporting and mounting said data storage device within said cartridge shell; and
a flex cable interconnecting said data storage device and said external data transfer interface.

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6. The data storage cartridge of Claim 4, additionally comprising registration holes at said external data transfer interface for acceptance of alignment pins to register said external data transfer interface with respect to said transfer station.

7. The data storage cartridge of Claim 6, wherein said registration holes are formed in a plastic material having electrical resistivity, said material electrically coupled to said data storage device at a ground thereof, thereby forming an electrostatic discharge path through said material to said alignment pins.

8. The data storage cartridge of Claim 4, wherein said external data transfer interface additionally comprises a power transfer interface coupled to said data storage device for transferring power from said transfer station to said data storage device.

9. The data storage cartridge of Claim 8, wherein said power transfer interface is coupled to said data storage device via said flex cable.

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10. The data storage cartridge of Claim **2**, wherein said data storage device comprises a magnetic disk drive assembly.

11. The data storage cartridge of Claim **2**, wherein said data storage device comprises an optical disk drive assembly.

5 **12.** The data storage cartridge of Claim **2**, wherein said data storage device comprises a non-volatile solid state memory assembly.

13. A transfer station for providing data transfer with respect to portable data storage cartridges, said data storage cartridge having generally an exterior dimensional form factor of a tape cartridge having a leader block, said leader block comprising a 5 hole therethrough for engagement by a threading pin, said transfer station comprising:

a receiver for receiving said portable data storage cartridge;

an optical source directed toward said location of said 10 leader block hole when a cartridge is at the end of travel in said receiver; and

a sensor positioned at the location of said leader block hole at the opposite side of said cartridge from said optical source for sensing the blockage of said optical source by a 15 cartridge shell blocking portion, thereby identifying said differentiated identification of said data storage cartridge, and indicating the presence of said data storage cartridge at said end of travel in said receiver.

14. The transfer station of Claim 13, wherein said optical 20 source comprises an infrared source, and wherein said sensor comprises an infrared sensor.

15. The transfer station of Claim 13, wherein said optical source comprises an LED optical source.

16. The transfer station of Claim 13, wherein said optical source comprises a focused source, providing a focused beam 5 directed toward said sensor.

17. The transfer station of Claim 13, additionally comprising:

a station data transfer interface for mating with an external data transfer interface of said data storage cartridge; and

10 a loading apparatus for positioning said data storage cartridge from said end of travel at said receiver to a position mating said external data transfer interface with said station data transfer interface.

18. The transfer station of Claim 17, additionally comprising 15 alignment pins for mating with registration holes of said data storage cartridge to register said external data transfer interface with said station data transfer interface.

19. The transfer station of Claim 18, wherein said registration holes of said data storage cartridge are electrically coupled to an electrostatic source therein, and wherein said alignment pins are conductive and coupled to a ground path, thereby forming an 5 electrostatic discharge path from said registration holes of said data storage cartridge to said ground path.

20. The transfer station of Claim 17, wherein said external data transfer interface of said data storage cartridge additionally comprises a power transfer interface; and wherein said station 10 data transfer interface additionally comprises:

a station power transfer interface for transferring power from said transfer station to said power transfer interface of said data storage cartridge; and

an electrical contact verification detector responsive to a 15 current to said cartridge power transfer interface for verifying electrical contact between said data storage cartridge and said station power transfer interface.

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21. The transfer station of Claim 20, wherein said station power transfer interface additionally comprises a ramping circuit, and is responsive to said verification of said electrical contact by said electrical contact verification detector, for thereupon 5 gradually ramping the application of power to said power transfer interface of said data storage cartridge.

22. An automated data storage library comprising:
- a plurality of storage shelves for storing portable data storage cartridges, some of said portable data storage cartridges comprising data storage media cartridges containing data storage media, and some of said cartridges comprising magnetic disk drive cartridges containing magnetic disk drives;
- at least one data storage drive for reading and/or writing data on said data storage media of said data storage media cartridges;
- 10 at least one transfer station for providing data transfer with respect to said magnetic disk drive cartridges; and
- at least one robot accessor for gripping and transporting said portable data storage cartridges amongst said storage shelves, said at least one data storage drive, and said at least 15 one transfer station.

23. The automated data storage library of Claim 22, wherein said data storage media cartridges and said magnetic disk drive cartridges comprise a substantially identical exterior dimensional form factor, and wherein said at least one robot accessor comprises a gripper for identically gripping said data storage media cartridges and said magnetic disk drive cartridges.

24. The automated data storage library of Claim 22, wherein said transfer station additionally comprises:

a station data transfer interface for mating with an external data transfer interface of said magnetic disk drive
5 cartridge; and

a loading apparatus for positioning said magnetic disk drive cartridge to a position mating said external data transfer interface with said station data transfer interface.

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25. The automated data storage library of Claim 24, wherein said transfer station additionally comprises alignment pins for mating with registration holes of said magnetic disk drive cartridge to register said external data transfer interface with said station data transfer interface.

26. The automated data storage library of Claim 25, wherein said registration holes of said magnetic disk drive cartridge are electrically coupled to an electrostatic source thereof, and wherein said transfer station alignment pins are conductive and coupled to a ground path, thereby forming an electrostatic discharge path from said registration holes of said magnetic disk drive cartridge to said ground path.

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27. The automated data storage library of Claim **24**, wherein said external data transfer interface of said magnetic disk drive cartridge additionally comprises a power transfer interface; and wherein said station data transfer interface additionally
5 comprises:

a station power transfer interface for transferring power from said transfer station to said power transfer interface of said magnetic disk drive cartridge; and

an electrical contact verification detector responsive to a
10 current to said cartridge power transfer interface for verifying electrical contact between said magnetic disk drive cartridge and said station power transfer interface.

28. The automated data storage library of Claim **27**, wherein said station power transfer interface additionally comprises a ramping
15 circuit, and is responsive to said verification of said electrical contact by said electrical contact verification detector, for thereupon gradually ramping the application of power to said power transfer interface of said magnetic disk drive cartridge.

29. A portable magnetic disk drive cartridge, comprising:
- a cartridge shell;
- an encased, self-contained, magnetic disk drive assembly having a rear end;
- 5 an external data transfer interface for providing data transfer with respect to a transfer station, said external data transfer interface mounted at said cartridge shell;
- a shock mount supporting and mounting said encased magnetic disk drive assembly within said cartridge shell, said encased
- 10 magnetic disk drive assembly positioned such that said rear end is opposite said external data transfer interface; and
- a flex cable interconnecting said rear end of said encased magnetic disk drive assembly with said external data transfer interface, said shock mount and said flex cable mechanically
- 15 isolating said encased magnetic disk drive assembly from said cartridge shell.

30. The portable magnetic disk drive cartridge of Claim 29, for use with an automated data storage library which is capable of storing portable data storage media cartridges in storage shelves
- 20 and having at least one robot accessor for gripping and transporting said portable data storage cartridges; wherein said cartridge shell comprises an exterior dimensional form factor for storage in said storage shelves and gripping by said robot

accessor; and wherein said external data transfer interface is mounted at said cartridge shell and coupled to said encased magnetic disk drive assembly for providing data transfer with respect to said automated data storage library.

5 **31.** The portable magnetic disk drive cartridge of Claim **30**, wherein said cartridge shell comprises a substantially identical exterior dimensional form factor as said portable data storage media cartridges.

10 **32.** The portable magnetic disk drive cartridge of Claim **29**, wherein said transfer station provides data transfer with respect to said portable magnetic disk drive cartridges, and comprises a plurality of alignment pins, and said portable magnetic disk drive cartridge additionally comprising a plurality of registration holes at said external data transfer interface for 15 acceptance of said alignment pins to register said external data transfer interface with respect to said transfer station.

20 **33.** The portable magnetic disk drive cartridge of Claim **32**, wherein said registration holes are formed in a plastic material having electrical resistivity, said material electrically coupled to said magnetic disk drive assembly at a ground thereof, thereby

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forming an electrostatic discharge path through said material to
said alignment pins.

34. The portable magnetic disk drive cartridge of Claim **29**,
wherein said external data transfer interface additionally
5 comprises a power transfer interface coupled to said encased
magnetic disk drive assembly for transferring power from said
transfer station to said encased magnetic disk drive assembly.

35. The portable magnetic disk drive cartridge of Claim **34**,
wherein said power transfer interface is coupled to said encased
10 magnetic disk drive assembly via said flex cable.

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36. A portable magnetic disk drive cartridge for use with an automated data storage library which is capable of storing portable data storage media cartridges in storage shelves and having at least one robot accessor for gripping and transporting 5 said portable data storage cartridges, comprising:

a cartridge shell comprising an exterior dimensional form factor for storage in said storage shelves and gripping by said robot accessor;

an encased magnetic disk drive assembly mounted in said 10 cartridge shell; and

an external data transfer interface coupled to said encased magnetic disk drive assembly for providing data transfer with respect to said automated data storage library.

37. The portable magnetic disk drive cartridge of Claim 36, 15 wherein said cartridge shell comprises a substantially identical exterior dimensional form factor as said portable data storage media cartridges.

38. The portable magnetic disk drive cartridge of Claim 37, wherein said automated data storage library provides data 20 transfer with respect to said portable magnetic disk drive cartridges at a transfer station, said transfer station

comprising a plurality of alignment pins, and said portable magnetic disk drive cartridge additionally comprising a plurality of registration holes at said external data transfer interface for acceptance of said alignment pins to register said external data transfer interface with respect to said transfer station.

39. The portable magnetic disk drive cartridge of Claim 38,
wherein said registration holes are formed in a plastic material having electrical resistivity, said material electrically coupled to said magnetic disk drive assembly at a ground thereof, thereby forming an electrostatic discharge path through said material to said alignment pins.

40. The portable magnetic disk drive cartridge of Claim 37,
wherein said automated data storage library provides data transfer with respect to said portable magnetic disk drive cartridges at a transfer station, and wherein said external data transfer interface of said portable magnetic disk drive cartridge additionally comprises a power transfer interface coupled to said encased magnetic disk drive assembly for transferring power from said transfer station to said encased magnetic disk drive assembly.

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41. The portable magnetic disk drive cartridge of Claim 40,
wherein said power transfer interface additionally comprises a
flex cable interconnecting said encased magnetic disk drive and
said external data transfer interface for transferring said power
5 to said encased magnetic disk drive assembly.

42. A transfer station for providing data transfer with respect to portable magnetic disk drive cartridges, comprising:

a station data transfer interface for mating with an external data transfer interface of said magnetic disk drive
5 cartridge; and

a loading apparatus for positioning said magnetic disk drive cartridge to a position mating said external data transfer interface with said station data transfer interface.

43. The transfer station of Claim 42, additionally comprising a 10 plurality of alignment pins for mating with a corresponding plurality of registration holes of said magnetic disk drive cartridge to register said external data transfer interface with said station data transfer interface.

44. The transfer station of Claim 43, wherein said registration 15 holes of said magnetic disk drive cartridge are electrically coupled to an electrostatic source thereof, and wherein said transfer station alignment pins are conductive and coupled to a ground path, thereby forming an electrostatic discharge path from said registration holes of said magnetic disk drive cartridge to 20 said ground path.

45. The transfer station of Claim 42, wherein said external data transfer interface of said magnetic disk drive cartridge additionally comprises a power transfer interface; and wherein said station data transfer interface additionally comprises:

5 a station power transfer interface for transferring power from said transfer station to said power transfer interface of said magnetic disk drive cartridge; and

an electrical contact verification detector responsive to a current to said cartridge power transfer interface for verifying
10 electrical contact between said magnetic disk drive cartridge and
said station power transfer interface.

46. The transfer station of Claim 45, wherein said station power transfer interface additionally comprises a ramping circuit, and is responsive to said verification of said electrical contact by
15 said electrical contact verification detector, for thereupon gradually ramping the application of power to said power transfer interface of said magnetic disk drive cartridge.